Space Weather Forecast

Issued on Sunday 27 October 2024 at 13:26 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: S2 Moderate Solar Radiation Storm ongoing. Coronal Mass Ejection arrival likely early day 2 (28 Oct) with G1-G2 Minor to Moderate storms possible. Further Moderate to Strong Solar Flares flares also likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate activity with the strongest flare 26/1206 UTC from the northeast limb, alongside some ongoing contribution form the fading long duration Strong flare from earlier in the day. There are thirteen regions on the disc, with the most complex in the southeast, due to a mixed magnetic polarity spot and some ongoing slight growth. This is one of three interconnected regions in the southeast disc with a history of significant flaring. A separate region on the southeast disc has seen the most notable growth with the emergence of intermediate spots and ongoing penumbra development. The other main region of note is likely the new region on the northeast limb, however this is hard to assess given its current location

No Earth-directed CMEs (coronal mass ejections) were observed in this period.

Solar Wind / Geomagnetic Activity: A glancing CME arrival was observed, likely from the strong flare on 24 Oct. Solar winds rose suddenly from background to become slightly elevated from 26/1535 UTC, then persisted 420-470km/s. Interplanetary Magnetic Field (IMF), also rose from Moderate levels to become Strong after 26/1535 UTC, peaking around 26/1900 UTC. The IMF then eased to be Moderate from 27/0900 UTC. The north-south component was strong, and varied between the north and south directions until around 27/0000 UTC, and then became Weak to Moderate and mainly northward. Geomagnetic activity was Quiet to Unsettled (Kp1-3) with an Active spell (Kp4) 26/1800-2400 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) rose through the period as a result of the two recent Strong flares. This reached the S1 Minor Radiation Storm level just after 26/1800 UTC, and the S2 Moderate Radiation Storm level just after 27/0830 UTC. This flux continued to slowly rise, with the particles likely being "snow-ploughed" ahead of the expected CME arrival.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High activity is expected, with further Moderate class flares expected and a chance of isolated Strong class flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Solar Wind / Geomagnetic Activity: A CME arrival is likely, associated with the Strong flare on 26 Oct. This is forecast to arrive early on day 2 (28 Oct), but with a wide uncertainty for the expected arrival time. This is most likely to be a glancing impact, however there is a chance of G1-G2 Minor to Moderate storms. Otherwise slightly elevated solar winds may ease a little on day 1 (27 Oct). Any CME influence on day 2 is then likely to continue into day 3 (29 Oct), perhaps further enhanced by the weak fast wind from a small coronal hole, before easing. Mainly Quiet to Unsettled geomagnetic activity is likely, however the CME arrival gives the chance of a spell of G1-G2 Minor to Moderate storms, most likely day 2 (28 Oct).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is expected to continue rising until the CME arrival on day 2 (28 Oct), but persisting at S2 Moderate Radiation Storm. A rapid fall in observed energetic particles is likely once the CME arrives. However further notable flares, will bring the potential for further enhancements through the period.

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	20	50	20	5
Strong	G3	No	5	15	1	1
Severe	G4	No	2	2	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	30	30	25	20

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	99	80	25	25
Very Active	**≥ S3 ***	No	10	10	10	10
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.